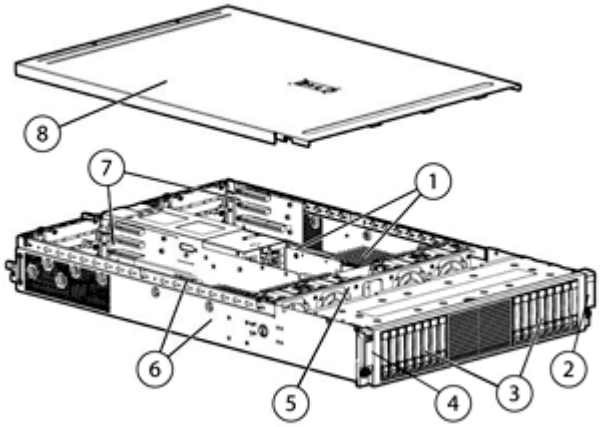
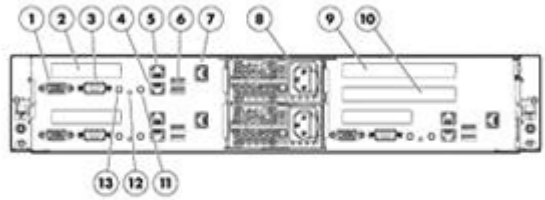
Overview

3 Node 16SFF HDD Model Illustrated





Front View:

1. 16 DDR3 DIMM slots
2. Optional Right Power Buttons, Health LEDs and UID bezel
3. 16 2.5" SFF SAS/SATA hard drive bays (alternate configuration available with 8 3.5" LFF SAS/SATA hard drive bays)
4. Optional Left Power Buttons, Health LEDs bezel
5. 4 x 80mm system fans
6. Quad-Core Intel® Xeon® 5500 series processors (supports up to two per node)
7. Low Profile PCIe x16 Gen2 Slot
8. Access panel

Rear View:

1. Video Port
2. Low-Profile PCI Express x16 Gen2 slot
3. Serial Port
4. One GbE LAN port (RJ-45)
5. One GbE LAN port with shared management (RJ-45)
6. Two USB ports
7. Optional dedicated management port (RJ-45)
8. Power supply cable socket
9. Full height / full length PCIe Gen2 Slot
10. Full height / half length PCIe Gen2 Slot
11. Power Button
12. Health LED
13. UID Button

What's New

- Additional Intel Xeon 5500 series processors
  - Xeon E5530, E5506 and L5530
- New storage offerings including SFF SATA HDDs and SSDs:
  - SATA Hot Plug SFF Midline Hard Disk Drives
  - SAS Hot Plug SFF 500GB Hard Disk Drive
  - SATA Hot Plug Midline Solid State Drives

At A Glance

The HP ProLiant DL1000 Multi Node Server is the first multi node DL server designed for higher density and increased power efficiency yet is flexible enough to be optimally configured for varying application requirements. The DL1000 supports up to four independent HP ProLiant DL170h G6 Servers in the 2U HP ProLiant h1000 G6 Chassis. The servers share power supplies and fans, providing greater power and cooling efficiencies. The HP ProLiant DL170h G6 Server is a two socket Intel server with 16 DDR3 DIMM slots.

Overview

- Processors:
  - Up to two Quad-Core Intel® processor 5500 sequence
  - Intel® 5520 Chipset
- Memory:
  - Up to 128 GB, using PC3-8500R DDR3 Registered (RDIMM) memory, operating at 800MHz when fully populated in 16 slots
  - Up to 24 GB, using PC3-10600E DDR3 Unbuffered (UDIMM) memory, operating at 1066MHz when fully populated at 2 DIMMs per Channel in 12 slots
- Network Controller:
  - HP NC362i Integrated Dual Port Gigabit Server Adapter with support for iSCSI
- Storage Controllers:
  - Non-Hot Plug SATA Models: HP Embedded SATA RAID Controller (RAID 0, 1, 10)
    NOTE: Transfer rate: up to 3 Gb/s SATA
    NOTE: To enable RAID on Embedded SATA, use the HP Smart Array B110i SATA Raid controller, To enable use of the B110i, enter the ROM based setup utility(RBSU). The option for enabling RAID can be found in the advanced section of the RBSU. For additional details www.hp.com/go/SATARAID
  - Hot Plug SAS/SATA Models: HP Smart Array Controller RAID 0,1,10, 5
    NOTE: Transfer rate: up to 6GB/s SAS, 3Gb/s SATA
- Expansion Slots:
  - Half Height Nodes (1U): One available PCI Express Gen 2.0 slots: (standard on 4-node BTO model)
    - Slot 1: Low profile PCI-Express 2.0 x16
  - Full Height Nodes (2U): three available riser options
    - Option 1: Up to three available PCI-Express Gen 2.0 slots:
      - Slot 1: full-length/full-height PCI-Express 2.0 x16
      - Slot 2: full-length/half-height PCI-Express 2.0 x4
      - Slot 3: low-profile PCI-Express 2.0 x4
    - Option 2: Up to three available PCI-Express Gen 2.0 slots:
      - Slot 1: full-length/full-height PCI-Express 2.0 x8
      - Slot 2: full-length/half-height PCI-Express 2.0 x8
      - Slot 3: low-profile PCI-Express 2.0 x8
    - Option 3: Up to two available PCI-Express Gen 2.0 slots: (standard on 2-node BTO model)
      - Slot 1: full-length/full-height PCI-Express 2.0 x16
      - Slot 2: low-profile PCI-Express 2.0 x8
- Infrastructure Management:
  - HP ProLiant Onboard Administrator Powered by Lights-Out 100i simplifies server setup, health monitoring, control, and Lights-Out 100 remote administration. Can be upgraded with a Lights-Out 100i Advanced License for Virtual KVM (remote graphical console) and Virtual Media.
  - HP Insight Control suite for Linux (ICE-LX), a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, control and optimize your IT infrastructure through a single, simple management console. The ICE-LX suite supports Linux-based servers and management consoles.
  - With G6, ProLiant 100-series server administrators are able to deploy and monitor their servers using methods similar to 300 series servers and above. Agents and the Easy Set-up CD are available that provide a user experiences consistent with 300 series and above.
    - With Easy Set-up CD, customers get SmartStart "like" deployment tools that reduce the time required for server setup and updates. Easy Set-up CDs and their ISO images are provided with each ProLiant G6 100-series server and are used to perform assisted installations for one or two servers. Users performing multi-server installations involving large numbers of servers may require the following deployment tools:
      - SmartStart Scripting Toolkit- Automated scalable deployment utility
      - Smart Components - a self-executable software consisting of driver and firmware
      - With agents and providers, ProLiant 100 series servers get environmental monitoring that is similar and consistent to that of ProLiant 300 series servers and above. This server now offers the HP Insight

Management Agents and HP Insight Management WBEM Providers, two well established sets of management and Internet standards technologies that provide capabilities which provide integration to HP Systems Insight Manager (SIM).

- Deployment/Serviceability:
  - ProLiant 100 series Server Set-up and Deployment software tools:
    - The HP ProLiant Easy Set-up CDs and ISO image downloads offer Assisted and Manual single server installation, setup, and deployment capability. Capabilities provided are:
      - AutoRun
      - Assisted Installation Microsoft Windows 2003 Server and Microsoft Windows 2008 Server
      - OS and SW available for Manual Installation are listed on each servers' QuickSpecs
    - Array Configuration Utility (ACU)
    - Array Diagnostics Utility (ADU)
    - HP Insight Diagnostics
    - Smart Components - self-executable software consisting of drivers
    - HP Smart Update Manager - a single system and multi-server deployment tool for Windows environments that works with Smart Components to provide customers with easy-to-use GUI and Script-based deployment capacity
    - SmartStart Scripting Toolkit - an automated scalable deployment utility
- Operating Systems and Virtualization Software Support for ProLiant:
  - Supports: Microsoft Windows, Red Hat, SLES, Citrix, VMWare ESX
- USB Ports:
  - Three USB ports / server node (two rear, one internal)
- Optical Drive:
  - External support only
- Chassis:
  - HP offers two different drive cages for the 2U HP ProLiant h1000 G6 Chassis
    - 8 LFF HDD Cage
    - 16 SFF HDD Cage
  - The 2U chassis can support three server node configurations:
    - Two full height nodes
    - One full height node and two half-height nodes
    - Four half-height nodes
- Power Supply:
  - The 2U chassis supports three power supply options:
    - Common Slot Power Supplies enable power capping and hot-pluggability
      - HP 1200W CS HE Silver Power Supply (Hot Plug, Autoswitching) - standard on BTO models
      - HP 750W CS HE Gold Power Supply (Hot Plug, Autoswitching)
      - HP 460W CS HE Gold Power Supply (Hot Plug, Autoswitching)
- Power Management:
  - In addition to the shared power and cooling infrastructure, the DL1000 contains advanced power metering and power capping technologies. The Power Interface Controller allows you to configure the system for full AC redundancy or AC redundancy with power throttling, depending on your configuration. With the optional Dynamic Power Capping mode, the DL1000 can boost the capacity of your data center by reclaiming trapped power and cooling capacity.
- Additional Features:
  - Support for:
    - NVIDIA Quadro FX5800 512MB PCIe x 16 graphics card
    - NOTE: For more information on the latest visualization and acceleration qualification status, please see http://www.hp.com/go/accelerators
    - NOTE: An HP DL170h Graphics Bracket/Cable Kit (P/N 536860-B21) is required when installing this NVIDIA card. The FX5800 can only be installed in the 2 slot full-height riser option: HP DL170h I/O Riser PCIe x16 x8 FIO option (P/N 512481-B21).
- Form Factor:
  - HP ProLiant h1000 G6 Chassis - 2U

Overview

- HP ProLiant DL170h Server - Half-width server node

- Warranty:
  - This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for one year from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.
    NOTE: Server Warranty includes 1 year Parts, 1 year Labor, 1-year on-site support with next business day response. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html.

Standard Features

NOTE: For the Standard Features shipped in the Factory Integrated Models, please see the "Configuration Information - Factory Integrated Models" section.

Processor One of the following depending on Model	Quad-Core Processors Intel® Xeon® Processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3) Intel® Xeon® Processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3) Intel® Xeon® Processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo, 2/2/3/3) Intel® Xeon® Processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) Intel® Xeon® Processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) Intel® Xeon® Processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2) Intel® Xeon® Processor L5530 (2.40 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2) Intel® Xeon® Processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2) Intel® Xeon® Processor L5506 (2.13 GHz, 4MB L3 Cache, 60W, DDR3-800) Intel® Xeon® Processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800) Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800) NOTE: HT indicates that the processor model supports Intel® Hyper-Threading Technology NOTE: Turbo indicates the maximum potential frequency increment when using Intel® Turbo Boost Technology, with 4, 3, 2, and 1 cores active. NOTE: DDR3 speed is the maximum memory speed of the processor. Actual memory speed may depend on the quantity and type of DIMMs installed. NOTE: For the Intel 5500 Series, the letter preceding the model number indicates the performance/wattage of the processor. "X" denotes High Performance/Wattage; "E" denotes Enterprise Performance/Wattage (Mainstream), and "L" denotes Lower Wattage. NOTE: Up to 2 processors supported. Mixing different processor models is not supported.
Upgradeability	Upgradeable to two processors (8 cores)
Chipset	Intel® 5520 Chipset NOTE: For more information regarding Intel chipsets, please see the following URL: http://www.intel.com/products/server/chipsets/
Cache Memory	8 MB (1 x 8MB) Level 2 cache NOTE: All processor models except for those identified below. 4 MB (1 x 4MB) Level 2 cache NOTE: For processors L5506 and E5504
Memory Protection	Advanced ECC capabilities

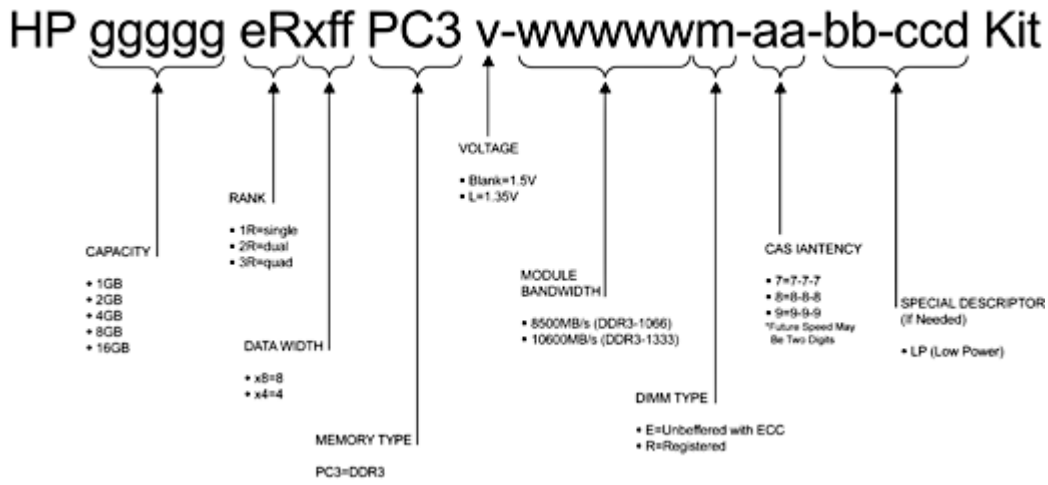
Standard Features

Memory

Type	DDR3 Registered (RDIMM) and Unbuffered (UDIMM)	
Standard (per server node)	6 GB	(3 x 2 GB) PC3-10600E (DDR3-1333) Unbuffered DIMMs
Maximum (RDIMM) (per server node)	128 GB	(16 x 8 GB) PC3-10600R-9R (DDR3-1333) for Registered Memory configurations
Maximum (UDIMM) (per server node)	24 GB	(12 x 2 GB) PC3-10600E (DDR3-1333) for Unbuffered Memory configurations

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1333MHz, 1066MHz, or 800MHz. Please see the Online Memory Configuration Tool at http://www.hp.com/go/ddr3memory-configurator

DDR3 Part Number Decoder



Network Controller HP NC362i Integrated Dual Port Gigabit Server Adapter with support for iSCSI

Expansion Slots

Full-height PCIe Riser Option	Expansion Slots #	Technology	Bus Width**	Connector Width*	Bus Number	Form Factor	Notes
	1	PCI-Express 2.0	x16	x16	4	Full length, full height	3.3 volts
	2	PCI-Express 2.0	x4	x4	6	Full length, half height	3.3 volts
	3	PCI-Express 2.0	x4	x4	7	Low Profile	3.3 volts

Full-height PCIe Riser Option	Expansion Slots #	Technology	Bus Width**	Connector Width*	Bus Number	Form Factor	Notes
	1	PCI-Express 2.0	x8	x8	4	Full length, full height	3.3 volts
	2	PCI-Express 2.0	x8	x8	5	Full length, half height	3.3 volts

Standard Features

	3	PCI-Express 2.0	x8	x8	7	Low Profile	3.3 volts
Full-height PCIe Riser Option (Standard in 2 Node BTO Models)	**Expansion Slots #**	**Technology**	**Bus Width****	**Connector Width***	**Bus Number**	**Form Factor**	**Notes**
	1	PCI-Express 2.0	x16	x16	4	Full length, full height	3.3 volts
	3	PCI-Express 2.0	x8	x8	6	Low Profile	3.3 volts
Half-height PCIe Riser (Standard in 4 Node BTO Models and with half-height nodes)	**Expansion Slots #**	**Technology**	**Bus Width****	**Connector Width***	**Bus Number**	**Form Factor**	**Notes**
	1	PCI-Express 2.0	x16	x16	4	Low Profile	3.3 volts

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

** Indicates the number of physical electrical lanes running to the connector.

Storage Controller

HP Embedded SATA RAID Controller (RAID 0, 1, 10) per server node

NOTE: Transfer rate: 3.0 Gb/s SATA

NOTE: A HP Smart Array Controller is required for SAS HDD and/or hot-plug HDD support. Transfer rate: 6.0 Gb/s SAS supported.

NOTE: When adding a Smart Array Controller to an 8 LFF SAS HDD configuration, a HP h1000 LFF SAS CONTROLLER CABLE OPTION KIT (P/N 519503-B21) must be ordered to connect the Smart Array Controller to the hard drive backplane. When a controller is added during a CTO buildup, the appropriate cables are included and this kit is not required. This cable kit is only needed for BTO configurations or if a CTO customer upgrades to a Smart Array Controller after initial purchase.

NOTE: When adding a Smart Array Controller to a 16SFF SAS HDD configuration, an HP h1000 SFF SAS CONTROLLER CABLE OPTION KIT (P/N 519507-B21) must be ordered to connect the Smart Array Controller to the hard drive backplane. When a controller is added during a CTO buildup, the appropriate cables are included and this kit is not required. This cable kit is only needed if a CTO customer upgrades to a Smart Array Controller after initial purchase.

NOTE: An external diskette drive, USB floppy drive key or virtual FDD using LO100 Advanced Pack is needed to install storage controller drivers during a Windows operating system installation from a CD.

Storage

Optical Drives	DVD drive via USB only
Diskette Drives	Via USB only
Drive Bays	Up to 8 Hot plug SAS/SATA 3.5" drives
One of the following depending on Model	Up to 16 Hot plug SAS/SATA 2.5" drives

Maximum Internal Storage

LFF 3.5" Hot Plug SATA	8.0TB	8 x 1TB
LFF 3.5" Hot Plug SAS	8.0TB	8 x 1TB
SFF 2.5" Hot Plug SATA	8.0TB	16 x 500GB
SFF 2.5" Hot Plug SAS	4.8TB	16 x 300GB

Standard Features

Interfaces	Network RJ-45(Ethernet)	2 10/100/1000 NIC ports (1 NIC shared for the HP ProLiant Lights Out 100i Remote Management)
	Serial	1
	Graphics	1
	USB	3 (two rear, one internal) NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.
	Management	1 Optional Dedicated LO100i Management Port
	Health LED	1 rear per server node (Optional front health LED per server node)
	Power	1 rear per server node (Optional front power button per server node)
	UID	1 rear per server node (Optional front UID per chassis)

Graphics

Integrated Matrox Graphics G200e, 32MB Standard

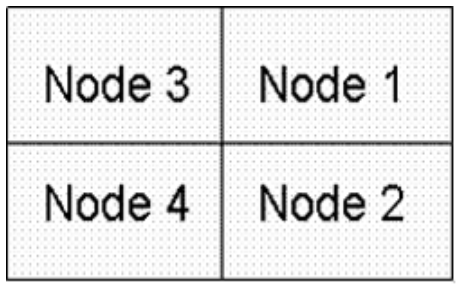
- 16 bit color: maximum resolution of 1600 x 1200
- 32 bit color: maximum resolution of 1280 x 1024

Form Factor

HP ProLiant h1000 G6 Chassis - 2U Chassis can support up to four DL170h server nodes in the 2U chassis.

HP ProLiant DL170h G6 Server - Half-width system board. Half-height (1U) or full-height (2U) depending on riser option selected.

4 Node Configuration - Front View



NOTE: For 2 node configurations, Nodes 2 and 4 are ordered. For 3 node configurations, Nodes 1, 2 and 4 are ordered.
NOTE: Additional nodes cannot be added later to 2 or 3 node configurations.

HP Insight Software

HP Insight Control suite for Linux (ICE-LX), as a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. The ICE-LX suite installs and license software modules that are integrated into HP System Insight Manager.

The HP Insight Control suite for Linux (ICE-LX) serves environments requiring a Linux-based management consoles. See: www.hp.com/go/ice-linux

HP Insight Control suites include one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more

Standard Features

	information about this service, please visit: http://www.hp.com/services/insight
HP ProLiant Onboard Administrator Powered by LO100i	HP ProLiant Onboard Administrator Powered by Lights-Out 100i, simplifies server setup, control, and lights-out remote administration of ProLiant 100 Series servers and functions without additional software. It can be accessed from any location via LAN or Internet and works hand-in-hand with HP Systems Insight Manager (SIM), helping customers unlock the value of the ProLiant platform and deliver the highest possible quality of IT service to the business. Advanced Licenses are required for Virtual KVM and Virtual Media feature activation. Key features of LO100i are: • IPMI 2.0 & SMASH CLP support • ROM Setup Utility • Improvements to virtual media with the addition of USB 2.0 drives and protocol support for much faster transfer speeds and DVD-ROM support plus simplified virtual media (floppy and CD with no FTTP server requirements) • Enhanced browser interface and embedded KVM over IP provides OS-independent remote graphical console • 24x7 Technical Support and Update (TSU) 1 year support and license upgrades included in Advanced license For more information, see: www.hp.com/go/lo100.
Remote Deployment Pack	HP Insight Rapid Deployment software (RDP) extends HP Systems Insight Manager with a complete deployment solution for HP ProLiant servers. RDP provides a central location to configure server hardware, deploy Windows, Linux and VMware ESX operating environments and install using images and scripted profiles. For more information, visit: http://www.hp.com/go/rdp. NOTE: Flexible and volume quantity license kits are available for Insight Software products. Refer to: http://www.hp.com/servers/proliantessentials or the various Insight Software product QuickSpecs for more information.
ProLiant 100 Series G6 Core Management Software for ProLiant 100 Series Servers	HP provides management solutions that are designed to simplify a server's installation, configuration, and maintenance throughout the entire server lifecycle. This provides the customers with higher levels of operational efficiency and highly reliable systems. While ProLiant 100 series G6 servers do not support the Insight Foundation Suite for ProLiant, they support a key subset of this important suite software tools and utilities which are very suitable for this class of server: SIM, SMH, agents, providers, and a SmartStart 'like' deployment CD called Easy Set-up which greatly simplifies server set-up. Additionally the DL100 and SL100 G6 models support the SmartStart Scripting Toolkit (SSSTK), an automated scalable deployment utility. Information on core management supported on ProLiant 100 series G6 servers can be found at these URLS: • Core Management: www.hp.com/go/coremanagement • HP ProLiant 100 series Easy Set-up CDs: www.hp.com/servers/easysetup

Core Infrastructure Management	HP Systems Insight Manager	HP Systems Insight Manager (HP SIM) provides a unified, secure and extensible standards-based environment to centrally manage servers, storage and other infrastructure devices, (both HP and non-HP) across multiple operating system platforms.

Standard Features

Insight Management Agents	HP Insight Management Agents and Insight Management Providers are available for HP Systems Insight Manager (SIM) Integration. ProLiant 100-series G6 servers can use the same SNMP based Insight Management Agents supported by other ProLiant servers. As a result, administrators can use HP Systems Insight Manager (SIM) 5.3 and greater to manage ProLiant 100-series G6 servers. Administrators can also use any other SNMP- based management tool. These agents are obtained as part of the ProLiant 100-series model-specific "Easy Set-up" CDs, or through http://www.hp.com/servers/easysetup The following capabilities are enabled on the 100-series G6 servers by the SNMP agents: • Health monitoring capabilities, including monitoring for drives, fans, network, power supplies, and temperature • Alerting capabilities, including basic alert notification for Smart Array drive pre-failure only • Performance monitoring capabilities providing information on processor, memory, disk free space, network utilization and I/ For additional information, please see: http://www.hp.com/go/insight
Easy Set-up CD	Easy Set-up CDs are available on all 100-series G6 servers and are also available as an ISO image web download. HP ProLiant Easy Set-up CDs provide easy, step-by-step, single and multi-server server utilities for the ProLiant 100-series G6 servers to streamline server setup for 100-series G6 servers. The user experience is consistent with SmartStart and offers the following capabilities: • Boot environment and GUI • Assisted Installation: Windows 2003 Server and Windows 2008 Server drivers • Manual installation: Windows 2003 Server, Windows 2008 Server, and Linux drivers (specific OS support varies by server. Refer to each server's QuickSpecs for supported versions) • HP Insight Diagnostics • AutoRun • Array Configuration Utility (ACU) has been combined with Array Diagnostics Utility (ADU) to offer both configuration of array controllers and storage devices and testing of array controller hardware • SmartStart Scripting Toolkit (SSSTK) and Smart Components for software and drivers NOTE: OS and SW available for Manual Installation are listed on each servers' QuickSpecs.
SmartStart Scripting Toolkit (SSSTK)	The SmartStart Scripting Toolkit is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The SmartStart Scripting Toolkit includes a set of utilities for configuring and deploying servers in a customized, predictable, and unattended manner. These utilities enable you to duplicate the configuration of a source server on target servers with minimum user interaction.

Standard Features

		The Toolkit is designed for IT experts with experience in scripting operating system installations and configuring ProLiant server hardware. For additional information, please see: http://h18004.www1.hp.com/products/servers/management/toolkit/index.html
	Subscriber's Choice	Subscriber's Choice Driver and Support Alerts/Notifications is a web-based email subscription service that provides software and driver change notifications for ProLiant products. Sign up at: http://www.hp.com/go/subscriberschoice and customize your profile to receive various new alerts as they become available, on a weekly or monthly basis.
	ROMPaq, software and latest drivers	The latest software, drivers, and firmware fully optimized and tested for your ProLiant server and options; downloaded from Software and Drivers download pages website at: http://www.hp.com/go/support and from www.hp.com/servers/easysetup. Contains the following: • HP Insight Management Agents for Systems Insight Manager (SIM) Integration • HP Systems Management Homepage • Array Configuration Utility (ACU) • Array Diagnostics Utility (ADU) • HP Insight Diagnostics

Industry Standard Compliance	ACPI V2.0 Compliant PCI 2.2 Compliant PXE Support WOL Support Microsoft® Logo certifications IPMI 2.0, DCMI 1.0. SMASH CLP compliant

Security	Power-on password Setup password Diskette boot control Secure Sockets Layer (SSL) Secure Shell (SSH)

Standard Features

Security - Trusted Platform Module	Trusted Platform Module option kit The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. NOTE: For more information about TPM, including a white paper, go to http://www.hp.com/go/TPM NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment. NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or loosing the key could result in data loss.
Server Power Cords	One 6' Highline (IEC-IEC) power cord ships standard NOTE: HP ProLiant DL servers are primarily connected to PDU's in data center racks so they ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately. NOTE: Japan BTO and CTO configurations get the 6' 4165151-291 power cord in addition. China BTO and CTO configurations get the 6' 416151-AA1 power cord in addition. NOTE: If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix's on the HP Power Protection and Management page. Under Power Cords, click on the "HP Power Cord Matrix" link. That link will list cable descriptions, requirements, and specifications for UPS and PDU units. Please see the following link: www.hp.com/products/powercords.
Power Supply	HP has a new design for ProLiant power- the new Common Slot Power Supply bay. This design provides the customer with commonality in power supplies across multiple platforms to save on the cost of spares and allows HP to offer multiple power solutions to fit the customers' needs. Many HP ProLiant Servers come with Common Slot, High Efficiency and Right-Size Power Supplies. The new HP Common Slot power supplies are designed for the highest power efficiency without degrading performance of the ProLiant server. Power Supplies have efficiency ratings up to 92%. There are three Right Size power options available depending on the configuration of your server. To make sure you select the correct power supply to meet your configuration, please use the HP Power Advisor at www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor. All HP Common Slot power sources are UL, CE Mark Compliant, Hot Plug and Redundant.

Standard Features

Common Slot Power Supply

It is highly recommended that you use the HP Power Advisor in defining the "Right-Size" power supply for your needs. HP offers three Power Supply Options:

- HP 460Watts, Common Slot,92% Efficiency
- HP 750Watts, Common Slot, 92% Efficiency
- HP 1200Watts, Common Slot, 90% Efficiency

The HP ProLiant Common Slot Power supplies meet multiple Energy Efficiency Initiatives: Climate Savers Computing Initiative GOLD and ECOS Consulting 80PLUS GOLD for the 460w and 750w Power Supplies and Climate Savers Computing Initiative Silver, ECOS Consulting 80PLUS Silver for 1200w Power Supply. HP has also been working with the EPA on developing an ENERGY STAR Computer Server specification and plans on offering models that meet the requirements when they are published. Please visit the ENERGY STAR website at www.energystar.gov for updates on the specification development process and approved platforms.

Optional power supplies can be purchased through power supply option kits (see Power Supply Options for part numbers).

Advanced Power Management: Power Interface Controller

In addition to the efficiencies gained by the shared power infrastructure, the DL1000 contains advanced power metering and capping capabilities. The embedded Power Interface Controller (PIC) is able to monitor power consumption and throttle the speed of the processors and memory in each node within the chassis in order to maintain a pre-set power budget. HP provides a simple command-line utility, called PIC, for reading and configuring the power control logic of the server nodes. Versions are available for MS Windows Server OS (2003 and 2008) and Linux OS with the requirement that the OS IPMI Driver be installed. The following Power Management modes for power redundancy are standard and are configurable in the controller:

- No Redundancy - power control disabled. No power throttling will occur.
- (DEFAULT) AC Redundancy with Throttling. This mode allows all nodes to share both power supplies and run at maximum performance with no power caps. Power control logic will only throttle the performance of each node in the case where the chassis only has one operational power-supply. In this mode, the box is expected to survive an unexpected AC Power loss to one of the power supplies.
- Full AC/DC Redundancy - power control logic will maintain a power cap value for the chassis at the DC rating of a single power supply (460W, 750W, or 1200W), such that if one power supply experiences a DC or AC failure, the chassis should remain on-line and operational.

The following power capping mode is included with the LO100 Advanced Pack:

- User Configurable Power Capping Mode - User specifies the power envelope for the 2U chassis, within the capabilities of the HW installed. Users run a utility to calibrate the minimum and maximum power consumption envelope for the chassis. In order to avoid any impact to performance due to throttling, a User selectable Power Cap value should not be set below the minimum power value provided by the utility.

System Fans

4 x 80mm system fans ship standard; Non-hot plug, Non-redundant.

Standard Features

Operating Systems and Virtualization Software Support for ProLiant Servers	Microsoft Windows Server Microsoft Windows Server Hyper-V Red Hat Enterprise Linux (RHEL) SUSE Linux Enterprise Server (SLES) VMware ESX Citrix XenServer NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: http://www.hp.com/go/ossupport and our driver download page www.hp.com/support/DL1000.
Rack Airflow Requirements	Rack 10000 G2 series Cabinets The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 G2 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors. CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment: Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation). Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches) CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage. NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: www.hp.com/servers/proliantdl170h
Rack Support	Quick deploy rail system provides tool-free support for racks with square or round mounting holes (including Compaq/HP 7000, 9000, 10000 G2 and HP series), with an adjustment range of 24" - 36".
Telco Rack Support	Support for all 2-post centered and 4 post Telco racks requires the use of the standard rack kit and an additional option kit from Rack Solutions at: http://www.racksolutions.com/hp/

Standard Features

Factory Express Portfolio for Servers and Storage

HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches.

For more information on Factory Express services for your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express.

HP Enterprise Configurator

The HP eConfigure Enterprise Configurator now provides factory default racking for our HP hardware portfolio. This approach is aligned with our strategic direction to meet the needs and expectations of our valued customers. If you require "custom" rack configuration, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator

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Service and Support

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack Services provide total care and support expertise with committed response designed to meet your IT and business needs.

HP Care Pack services include coverage for the HP branded hardware options qualified for the server that are purchased at the same time or afterward and internal to the enclosure. It also includes the 22" and smaller external monitors and tower UPS options up to 3kVA. These items will be covered at the same service level and for the same coverage period as the server. Coverage of UPS Battery is not included and standard warranty terms & conditions apply. For servers or storage systems installed within a rack, service also covers all HP qualified rack options installed within the same rack.

To fully capitalize on your HP ProLiant servers' capabilities requires a service partner who thoroughly understands your server technology and systems environment. HP Services, an industry leader in provision of multi vender support solutions provides a range of support services designed to meet the varying needs of business. Whether an SMB or large global corporation HP has a ProLiant server support offer to help you speedily deploy and maximize system uptime.

Recommended Service – Simplify ProLiant solution implementation, maintenance and management.

- Support Service – 3 Year, 9x5 Next Business Day coverage, excluding HP holidays only
- Deployment Service – Hardware Installation only

Enhanced Service – Optimize service level to increase IT performance and availability

- Support Service – 3 Year 13x5 Same Business Day, 4-Hour response coverage
- Deployment Service – Installation and Start-up only

Installation & Start-Up of a ProLiant server and Microsoft or Linux O/S per the Customer Description and/or Data Sheet. To be delivered on a scheduled basis 8am-5pm, M-F, excl. HP holidays.

For a complete listing of service offerings and information visit:
http://www.hp.com/services/proliantservices
http://www.hp.com/go/proliant/carepack

HPC Interconnects

NOTE: High Performance Computing (HPC) interconnect technologies are available for the DL170h G6 under the Cluster Platform product portfolio. These high-speed interconnects are fully supported by HP when they are part of these configure to order clusters. Solutions can be defined with a lot of flexibility with the help of configuration tools. Please visit the following URL to configure HPC Clusters with InfiniBand, Gigabit Ethernet or Myrinet Interconnects: http://www.hp.com/techservers/clusters/ucp/index.html

HPC Interconnects	InfiniBand	PCI-Express adapters
	Gigabit Ethernet	Use embedded ports

Eight Drive Serial ATA (SATA) 2 Node Models

NOTE: Upgrading to 8 Hot Plug SATA/SAS hard drives requires the addition of a storage controller (Smart Array P212/256MB recommended), and one HP h1000 LFF SAS CTTLR CABLE OPT KIT per controller (P/N 519503-B21).

HP DL2x170h E5504 3x2GB 8LFF SVR
503581-001

Processor(s)	One Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800) / server node
Cache Memory	4MB shared L3 cache
Memory	6GB (3 x 2GB) PC3-10600E (UDIMM) / server node
Network Controller	Embedded HP NC362i Integrated Dual Port Gigabit Server Adapter
Storage Controller	Embedded SATA Raid Standard RAID 0,1,10
Hard Drive	None ship standard
Internal Storage	8.0TB (8 x 1TB Hot Plug 3.5" SATA hard drives), Maximum 8.0TB (8 x 1TB Hot Plug 3.5" SAS hard drives), Maximum NOTE: SAS and/or hot-plug functionality requires the addition of a Smart Array controller.
Optical Drive	External support only
Power Supply	1 x 1200Watts, Common Slot Power Supply Standard 2nd 1200W Power Supply Optional
Fans	4 x 80mm system fans ship standard; Non-hot plug, Non-redundant
Form Factor	HP ProLiant h1000 G6 Chassis - 2U HP ProLiant DL170h G6 Server - Half-width server node

Eight Drive Serial ATA (SATA) 4 Node Models

NOTE: Upgrading to 8 Hot Plug SATA/SAS hard drives requires the addition of a storage controller (Smart Array P212/256MB recommended), and one HP h1000 LFF SAS CTTLR CABLE OPT KIT per controller (P/N 519503-B21)

HP DL4x170h E5504 3x2GB 8LFF SVR
503578-001

Processor(s)	One Intel® Xeon® Processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800) / server node
Cache Memory	4MB shared L3 cache
Memory	6GB (3 x 2GB) PC3-10600E (UDIMM) / server node
Network Controller	Embedded HP NC362i Integrated Dual Port Gigabit Server Adapter
Storage Controller	Embedded SATA Raid Standard RAID 0,1,10
Hard Drive	None ship standard
Internal Storage	8.0TB (8 x 1TB Hot Plug 3.5" SATA hard drives), Maximum 8.0TB (8 x 1TB Hot Plug 3.5" SAS hard drives), Maximum NOTE: SAS and/or hot-plug functionality requires the addition of a Smart Array controller and SAS Controller Cable Option Kit.
Optical Drive	External support only
Power Supply	1 x 1200Watts, Common Slot Power Supply Standard 2nd 1200W Power Supply Optional
Fans	4 x 80mm system fans ship standard; Non-hot plug, Non-redundant
Form Factor	HP ProLiant h1000 G6 Chassis - 2U HP ProLiant DL170h G6 Server - Half-width server node

NOTE: This section lists some of the steps required to configure a Factory Integrated Model. To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for additional information.
NOTE: HP does not allow factory integration of options into standard models listed above. Configure-to-order servers must start with a CTO Chassis
NOTE: FIO indicates that this option is a Factory Installable Option.

Step 1: Base Configuration (choose one from each list unless otherwise noted)

Chassis	HP ProLiant h1000 G6 2U Chassis FIO	507653-B21
Node Setting	HP h1000 2 Node Side by Side FIO Kit	516030-B21
	HP h1000 3 Node FIO Kit	518028-B21
	HP h1000 4 Node FIO Kit	518029-B21
Nodes	HP ProLiant DL170h G6 Node1 CTO Server	507638-B21
	HP ProLiant DL170h G6 Node2 CTO Server	507639-B21
	HP ProLiant DL170h G6 Node3 CTO Server	507640-B21
	HP ProLiant DL170h G6 Node4 CTO Server	507641-B21
	NOTE: A minimum of two nodes are required per 2U chassis. There are only three options for ordering DL170h G6 Nodes. 1) 2 Node Config: user must order Nodes 2 and 4; 2) 3 Node Config: user must order Nodes 1, 2 and 4; or 3) 4 Node Config: user must order Nodes 1, 2, 3 and 4. NOTE: Additional nodes cannot be added later to 2 or 3 node configurations.	
Hard Disk Drive Cage	HP h1000 G6 8 LFF Drive Cage FIO Kit NOTE: This selection requires that only SATA drives can be selected and SAS Controller cannot be added to any node.	507654-B21
	HP h1000 G6 8 LFF Drive SAS Ctlr Cage FIO Kit NOTE: With this selection, SAS and SATA drives can be selected but a SAS controller must be selected for each node.	538666-B21
	HP h1000 G6 16 SFF Drive Cage FIO Kit NOTE: This selection requires that only SATA drives can be selected and SAS Controller cannot be added to any node.	507655-B21
	HP h1000 G6 16 SFF Drive SAS Ctlr Cage FIO Kit NOTE: With this selection, a SAS controller must be selected for each node.	538667-B21
Power Supplies	HP 460W CS HE Power Supply Kit	503296-B21
	HP 750W CS HE Power Supply Kit	512327-B21
	HP 1200W CS HE Power Supply Kit	500172-B21
	NOTE: Selection of a Common Slot High Efficiency Power Supply requires the purchase of a Common Slot Power Supply Backplane FIO Kit (P/N: 516136-B21).	
	NOTE: Refer to HP Power Advisor when selecting a power supply for your configuration, www.hp.co/go/hppoweradvisor. Many HP ProLiant Servers now offer new power options, including Common Slot Power Supplies. These power supplies come in multiple power ratings and higher efficiency levels to offer the Right Size solution to fit your configuration. This provides improved power delivery and the advantage of reclaiming lost power. Prior to making a power supply selection it is "highly recommended" that the "HP Power Advisor" is run to determine the right size power supply for your server configuration. The HP Power Advisor is located at	

	"www.hp.com/go/proliant-energy-efficient" or www.hp.com/go/hppoweradvisor	
Power Supplies - Enablement Kits	HP h1000 Common Slot PS BP FIO Kit NOTE: This backplane must be ordered with any Common Slot High Efficiency Power Supply.	516136-B21

Step 2: Choose Required Node Options (only one of the following from each list unless otherwise noted)

Processors	Quad-Core Processors	
	Intel® Xeon® processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO Base NOTE: If 2 processors are desired, select one 507889-L21 and one 507889-B21.	507889-L21
	Intel® Xeon® processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO Base NOTE: If 2 processors are desired, select one 538757-L21 and one 538757-B21.	538757-L21
	Intel® Xeon® processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3), FIO Base NOTE: If 2 processors are desired, select one 503582-L21 and one 503582-B21.	503582-L21
	Intel® Xeon® processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO Base NOTE: If 2 processors are desired, select one 507890-L21 and one 507890-B21.	507890-L21
	Intel® Xeon® processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO Base NOTE: If 2 processors are desired, select one 583381-L21 and one 583381-B21.	583381-L21
	Intel® Xeon® processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2), FIO Base NOTE: If 2 processors are desired, select one 503583-L21 and one 503583-B21.	503583-L21
	Intel® Xeon® processor L5530 (2.40 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2), FIO Base NOTE: If 2 processors are desired, select one 583133-L21 and one 583133-B21.	583133-L21
	Intel® Xeon® processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2), FIO Base NOTE: If 2 processors are desired, select one 507891-L21 and one 507891-B21.	507891-L21
	Intel® Xeon® processor L5506 (2.13 GHz, 4MB L3 Cache, 60W, DDR3-800), FIO Base NOTE: If 2 processors are desired, select one 503585-L21 and one 503585-B21.	503585-L21
	Intel® Xeon® processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800), FIO Base NOTE: If 2 processors are desired, select one 583383-L21 and one 583383-B21.	583383-L21
	Intel® Xeon® processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800), FIO Base NOTE: If 2 processors are desired, select one 503584-L21 and one 503584-B21.	503584-L21

Configuration Information - Factory Integrated Models

Memory	Registered DIMMs (RDIMMs)	
	HP 2GB 2Rx8 PC3-10600R-9 Kit	500656-B21
	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
	HP 4GB 4Rx8 PC3-8500R-7 LP Kit	500660-B21
	HP 8GB 2Rx4 PC310600R-9 Kit	500662-B21
	HP 8GB 2Rx4 PC3-8500R-7 Kit	516423-B21
	Unbuffered with ECC DIMMs (UDIMMs) NOTE: Maximum 12 DIMMs supported per node.	
	HP 1GB 1Rx8 PC3-10600E-9 Kit	500668-B21
	HP 2GB 2Rx8 PC3-10600E-9 Kit	500670-B21
	NOTE: For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.	
	NOTE: There is a maximum support limitation of 8 ranks per memory channel (maximum of 2 quad rank DIMMs per channel)	
	NOTE: Memory Min and Max depends on number of processors and type of memory: 1 Processor -> R-Dimm: Min 1 // Max 8 U-Dimm: Min 1 // Max 6 2 Processors -> R-Dimm: Min 2 // Max 16 U-Dimm: Min 2 // Max 12	
Riser Cards	Full-height	
	HP DL170h I/O Riser PCIe x16 x4 x4 FIO	514005-B21
	HP DL170h I/O Riser PCIe x8 x8 x8 FIO	503587-B21
	HP DL170h I/O Riser PCIe x16 x8 FIO NOTE: The 2 slot riser (P/N: 512481-B21) is the only riser option that supports the NVIDIA FX5800 graphics card.	512481-B21
	Half-height	
	HP DL170h I/O Riser PCIe x16 FIO NOTE: This is the only riser option for 4 Node configurations.	503586-B21

Step 3: Choose Additional Factory Integratable Options (only one of the following from each list unless otherwise noted)

Front Power option	HP h1000 Front Power Right FIO Kit	516022-B21
	HP h1000 Front Power Left FIO Kit	516001-B21
	NOTE: Each ProLiant DL170h Server comes with a rear UID, Power Button and Health LED. These options provide a front facing option that will power up to two nodes each. If a 3 or 4 Node Setting kit is selected in Step 1, then both power button kits must be ordered. If the 2 Node Setting kit is selected in Step 1, then only the Right Power Kit (P/N: 516022-B21) is needed.	
Storage Controllers	NOTE: A minimum of one SAS Controller per server node is required when purchasing a SAS HDD Model (P/N 538666-B21 or 538667-B21). NOTE: The P410 Controller is not supported in a Low Profile PCIe G2 slot. For all 8 LFF SAS HDD configurations, a P212 is required. For 16 SFF SAS HDD configurations with 4 nodes, a P212 is required. For 16 SFF SAS HDD configurations with 2 nodes, a P410 is required and the card must be populated in the FH/FL or FH/HL PCI slot. In a 16 SFF SAS HDD configuration with 3 nodes, a P212 is required for both half-height nodes, each supporting 4 HDDs, and a P410 is required for the full height node, supporting 8 HDDs and must be populated in the FH/FL or FH/HL PCI slot.	
	HP P410/ZM FIO Smart Array Controller	462860-B21
	HP P411/256 FIO SA Cntrlr w/Battery	491193-B21
	HP P410/256 FIO SA Cntrlr w/Battery	491195-B21
	HP P212/256 FIO SA Cntrlr w/Battery	491191-B21

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below.

Core Options

NOTE: Some options may not be factory integratable. Contact your local sales representative for additional information.

Unique Options	HP DL170h Dedicated Management Port OPT Kit NOTE: Each ProLiant DL170h G6 Server comes standard with sideband support for LO100i through the shared, system NIC. Order this option (P/N 575498-B21) if a dedicated management network is desired.	575498-B21
	HP h1000 LFF SAS Ctlr Cable OPT Kit NOTE: When adding a Smart Array Controller to an 8LFF SAS HDD configuration, a HP h1000 LFF SAS CONTROLLER CABLE OPTION KIT (P/N 519503-B21) must be ordered to connect the Smart Array Controller to the hard drive backplane. When a controller is added during a CTO buildup, the appropriate cables are included and this kit is not required. This cable kit is only needed for BTO configurations or if a CTO customer upgrades to a Smart Array Controller after initial purchase.	519503-B21
	HP h1000 SFF SAS Ctlr Cable OPT Kit NOTE: When adding a Smart Array Controller to a 16SFF SAS HDD configuration, a HP h1000 SFF SAS CONTROLLER CABLE OPTION KIT (P/N 519507-B21) must be ordered to connect the Smart Array Controller to the hard drive backplane. When a controller is added during a CTO buildup, the appropriate cables are included and this kit is not required. This cable kit is only needed if a CTO customer upgrades to a Smart Array Controller after initial purchase.	519507-B21
	HP DL170h Graphics Brkt/Cable Kit NOTE: This option must be ordered if an NVIDIA FX5800 is installed in a full-height 2 slot riser. The FX5800 can only be installed in the 2 slot riser option: HP DL170h I/O Riser PCIe x16 x8 FIO option, part number 512481-B21.	536860-B21
Processors	Quad-Core Processors	
	Intel® Xeon® processor X5570 (2.93 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	507889-B21
	Intel® Xeon® processor X5560 (2.80 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	538757-B21
	Intel® Xeon® processor X5550 (2.66 GHz, 8MB L3 Cache, 95W, DDR3-1333, HT, Turbo 2/2/3/3)	503582-B21
	Intel® Xeon® processor E5540 (2.53 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	507890-B21
	Intel® Xeon® processor E5530 (2.40 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	583381-B21
	Intel® Xeon® processor E5520 (2.26 GHz, 8MB L3 Cache, 80W, DDR3-1066, HT, Turbo 1/1/2/2)	503583-B21
	Intel® Xeon® processor L5530 (2.40 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2)	583133-B21
	Intel® Xeon® processor L5520 (2.26 GHz, 8MB L3 Cache, 60W, DDR3-1066, HT, Turbo 1/1/2/2)	507891-B21
	Intel® Xeon® processor L5506 (2.13 GHz, 4MB L3 Cache, 60W, DDR3-800)	503585-B21
	Intel® Xeon® processor E5506 (2.13 GHz, 4MB L3 Cache, 80W, DDR3-800)	583383-B21
	Intel® Xeon® processor E5504 (2.00 GHz, 4MB L3 Cache, 80W, DDR3-800)	503584-B21

Core Options

Memory	Registered DIMMs (RDIMMs)	
	HP 2GB 2Rx8 PC3-10600R-9 Kit	500656-B21
	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
	HP 4GB 4Rx8 PC3-8500R-7 LP Kit	500660-B21
	HP 8GB 2Rx4 PC310600R-9 Kit	500662-B21
	HP 8GB 2Rx4 PC3-8500R-7 Kit	516423-B21
	Unbuffered with ECC DIMMs (UDIMMs) NOTE: Maximum 12 DIMMs supported per node.	
	HP 1GB 1Rx8 PC3-10600E-9 Kit	500668-B21
	HP 2GB 2Rx8 PC3-10600E-9 Kit	500670-B21
	NOTE: For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.	
	NOTE: There is a maximum support limitation of 8 ranks per memory channel (maximum of 2 quad rank DIMMs per channel)	
Optical Drives	HP External USB CD/DVD R/RW Optical Drive	FS943AA
Hard Drives	NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components. NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.	
	SAS Hot Plug 3.5" Enterprise (ENT) Drives	
	HP 600GB 6G SAS 15K 3.5" DP ENT HDD	516828-B21
	HP 400GB 3G 10K 3.5" DP SAS ENT HDD	459508-B21
	HP 450GB 6G SAS 15K 3.5" DP ENT HDD	516816-B21
	HP 450GB 3G 15K 3.5" DP SAS ENT HDD	454232-B21
	HP 300GB 6G SAS 15K 3.5" DP ENT HDD	516814-B21
	HP 300GB 3G SAS 15K 3.5" DP HDD	416127-B21
	HP 146GB 3G SAS 15K 3.5" DP HDD	384854-B21
	HP 72GB 3G SAS 15K 3.5" DP HDD	384852-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html (Worldwide)	
	NOTE: If using SAS hard drives, a Smart Array controller is required. For BTO configurations only, and For 3.5" drive cable kit P/N 519503-B21 or for 2.5" cable kit P/N 519507-B21	
	SAS Hot Plug 3.5" Midline (MDL) Drives	
	HP 1TB 3G SAS 7.2K 3.5" DP MDL HDD	461137-B21
	HP 750GB 3G SAS 7.2K 3.5" DP MDL HDD	461135-B21

SAS Hot Plug SFF Midline (MDL) Drives	
HP 500GB 6G SAS 7.2K SFF DP MDL HDD	507610-B21
SAS Hot Plug SFF Enterprise (ENT) Drives	
HP 300GB 6G SAS 10K SFF DP ENT HDD	507127-B21
HP 300GB 3G SAS 10K SFF DP ENT HDD	492620-B21
HP 146GB 6G SAS 15K SFF DP ENT HDD	512547-B21
HP 146GB 3G SAS 15K SFF DP ENT HDD	504062-B21
HP 146GB 6G SAS 10K SFF DP ENT HDD	507125-B21
HP 146GB 3G SAS 10K SFF DP ENT HDD	418367-B21
HP 72GB 6G SAS 15K SFF DP ENT HDD	512545-B21
HP 72GB 3G SAS 15K SFF DP ENT HDD	418371-B21
HP 72GB 3G SAS 10K SFF DP ENT HDD	384842-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html (Worldwide)	
SATA Hot Plug 3.5" Entry (ETY) Drives	
HP 160GB 3G SATA 7.2K 3.5" ETY HDD	458945-B21
SATA Hot Plug 3.5" Midline (MDL) Drives	
HP 1TB 3G SATA 7.2K 3.5" MDL HDD	454146-B21
HP 750GB 3G SATA 7.2K 3.5" MDL HDD	458930-B21
HP 500GB 3G SATA 7.2K 3.5" MDL HDD	458928-B21
HP 250GB 3G SATA 7.2K 3.5" MDL HDD	458926-B21
SATA Hot Plug SFF Midline (MDL) Drives	
HP 500GB 3G SATA 7.2K 2.5in MDL HDD	507750-B21
HP 160GB 3G SATA 7.2K 2.5in MDL HDD	530888-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html (Worldwide)	
SATA Hot Plug Midline (MDL) Solid State Drives	
HP 60GB 3G SATA 2.5in MDL 1y Wty SSD	572071-B21
HP 120GB 3G SATA 2.5in MDL 1y Wty SSD	572073-B21
SATA Hot Plug 3.5" Midline (MDL) Solid State Drives	
HP 60GB 3G SATA 3.5in MDL 1y Wty SSD	570761-B21
HP 120GB 3G SATA 3.5in MDL 1y Wty SSD	570763-B21
NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13415_na/13415_na.html (Worldwide)	

Core Options

Communications	HP NC112T PCIe Gigabit Server Adapter	503746-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter NOTE: Does not support Windows 2000.	435508-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter	458492-B21
	HP NC522SFP Dual Port 10GbE Server Adapter NOTE: A minimum of two gigabyte (2 GB) of server memory is required per each NC522SFP adapter. NOTE: Direct Attach Cable (DAC) for copper environments or fiber transceivers and cables for fiber-optic environments must be purchased separately. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs.	468332-B21

Additional Options

Remote Management	HP LO100i Advanced Pack, No Media 1-Server License including 1 year of 24x7 Technical Support and Updates NOTE: For additional information, please see the Lights-Out 100i QuickSpecs at www.hp.com/go/lo100	530521-B21
HP Insight Control Suite	HP Insight Control suite for Linux (ICE-LX)	
	HP Insight Control suite for Linux, Media pack (DVD) - No licenses included NOTE: This optional Media pack DVD contains the ISO image for HP Insight Control suite for Linux, HP Systems Insight Manager, HP Insight Power Manager, HP Insight Virtual Machine Manager software for ProLiant, and an integrated installer. Servers must be acquired separately. NOTE: This Media pack is optional because the latest ISO image and latest updates may be downloaded at no cost from: http://www.hp.com/go/ice-linux (click on Download button).	464422-B22
	HP Insight Control suite for Linux, No Media, 1-Server license, including one year of 24x7 Technical Support and Updates NOTE: This part number can be used to purchase one (1) license with a single activation key. Customer will receive a printed license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support and Update Service. NOTE: One certificate is shipped for each license. NOTE: For additional License Kits, please see the QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/13019_na/13019_na.html	464423-B22
Graphics Cards Options	HP DL170h Graphics Brkt/Cable Kit NOTE: This option must be ordered if an NVIDIA FX5800 is installed in a full-height 2 slot riser. The FX5800 can only be installed in the 2 slot riser option: HP DL170h I/O Riser PCIe x16 x8 FIO option, part number 512481-B21.	536860-B21
Security	HP Trusted Platform Module Option Kit	488069-B21

Additional Options

Storage Controllers	**HP Smart Array P800 Controller**	
	HP Smart Array P800/512 BBWC Controller	381513-B21
	HP Smart Array P212 Controller	
	HP Smart Array P212/256MB Controller	462834-B21
	HP Smart Array P212/Zero Memory Controller	462828-B21
	HP Smart Array P410 Controller	
	HP Smart Array P410/256MB Controller	462862-B21
	HP Smart Array P410/512MB with BBWC	462864-B21
	HP Smart Array P411 Controller	
	HP Smart Array P411/256MB Controller	462830-B21
	HP Smart Array P411/512MB BBWC	462832-B21
	Optional Upgrades	
	256 MB Cache Module NOTE: Supported on HP Smart Array P212 Controller only.	462968-B21
	512MB BBWC NOTE: When used with the embedded HP Smart Array P410i controller, this battery module also requires a 24 inch SFP Battery Cable (496029-B21).	462967-B21
	Battery Kit upgrade NOTE: To enable BBWC on the 256MB cache. NOTE: Requires 256 MB Cache Module. When used with the embedded HP Smart Array P410i controller, this battery module also requires a 24 inch SFP Battery Cable (496029-B21). NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12616_na/12616_na.html (Smart Array P800 Controller) http://h18000.www1.hp.com/products/quickspecs/13203_na/13203_na.html (Smart Array P212 Controller) http://h18000.www1.hp.com/products/quickspecs/13201_na/13201_na.html (Smart Array P410 Controller) http://h18000.www1.hp.com/products/quickspecs/13202_na/13202_na.html (Smart Array P411 Controller)	462969-B21
	SCSI HBA	
	HP SC11Xe Host Bus Adapter NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12566_na/12566_na.html (SCSI HBA)	412911-B21

Additional Options

HPC Specific Options	HP IB 4X DDR PCI-e Dual Port 0 Memory HCA	483513-B21
	HP IB 4X DDR Conn-X PCI-e G2 Dual Port HCA	483514-B21
	HP IB 4X DDR PCI-e Dual Port HCA	409376-B21
	HP IB 4X DDR PCI-e DUAL PORT HCA	448397-B21
	NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/13078_na/13078_na.html	
HP StorageWorks Modular Smart Array	MSA SAN Storage Arrays	
	HP StorageWorks 50 Modular Smart Array	364430-B21
	NOTE: Rack-mountable 10 SFF drive enclosure with single I/O module, redundant hot plug power supplies and hot plug fans. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12245_na/12245_na.html	
	HP StorageWorks 60 Modular Smart Array	418408-B21
	NOTE: Rack-mountable 12-drive (3.5" 3G SAS/1.5G SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html	
	HP StorageWorks 70 Modular Smart Array	418800-B21
	NOTE: Rack-mountable 25-drive (2.5" 3G SAS/1.5G SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies. NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html	
StorageWorks Options	StorageWorks Fibre Channel HBA	
	NOTE: The following is a list of all Fibre Channel Host Bus Adapters for Windows and Linux. For detailed compatibility information please see: http://h18006.www1.hp.com/storage/saninfrastructure/hba.html	
	Emulex Fibre Channel HBAs	
	HP StorageWorks 81E PCI-e FC HBA Single Port	AJ762A
	HP StorageWorks 82E PCI-e FC HBA Dual Port	AJ763A
	HP StorageWorks FC2142 4Gb PCI-e HBA	A8002A
	HP StorageWorks FC2242 Dual Channel 4Gb PCI-e HBA	A8003A
	QLogic Fibre Channel HBAs	
	HP StorageWorks 81Q PCI-e FC HBA Single Port	AK344A
	HP StorageWorks 82Q PCI-e FC HBA Dual Port	AJ764A
	HP StorageWorks FC1142 4Gb PCI-e HBA	AE311A
	HP StorageWorks FC1242 Dual Channel 4Gb PCI-e HBA	AE312A
	StorageWorks SCSI HBA	
	HP U320e SCSI Host Bus Adapter	AH627A

NOTE: Recommended Dual Channel Ultra320 SCSI Controller for connecting multi-drive MSL tape libraries to ProLiant servers.

Uninterruptible Power Systems

HP Rack-mountable UPS

HP UPS R1500 G2 UPS

HP, R1.5k VA UPS, 1U	AF419A

NOTE: Please see the QuickSpecs for additional information: http://h18000.www1.hp.com/products/quickspecs/12507_na/12507_na.html

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HP Rack Series

HP Rack 10000 G2 Series (Carbon/Graphite Metallic)

10642 G2 (42U) Rack Cabinet 1200mm Deep - Shock Pallet	AF034A
10642 G2 (42U) Rack Cabinet 1200mm Deep - Pallet	AF038A
10647 G2 (47U) Rack Cabinet 1200mm Deep - Shock Pallet	AF044A

NOTE: Due to handling and shipping requirements, AF044A is only orderable through HP Factory Express. It is not for direct sales. Customer site surveys are required before an order is approved. CTO orders may require additional lead time.

10647 G2 (47U) Rack Cabinet 1200mm Deep - Pallet	AF045A

NOTE: It is mandatory to use a shock pallet when shipping racks with equipment installed.

NOTE: Please see the Rack 10000 G2 QuickSpecs for Technical Specifications such as height, width, depth, weight, and color: http://h18000.www1.hp.com/products/quickspecs/12402_na/12402_na.html

NOTE: For additional information regarding Rack Cabinets, please see the following URL: http://www.hp.com/go/rackandpower.

HP Rack Options

HP KVM Switch Options

2x1x16 IP Console Switch with Virtual Media	AF601A
4x1x16 IP Console Switch with Virtual Media	AF602A
2x16 Server Console Switch with Virtual Media	AF600A
PS/2 Virtual Media Interface Adapter, 1 pack	AF604A

NOTE: Requires PS/2 and one USB port on server.

Server Console Switch (KVM), 0 x 2 x 8 port	AF616A
Server Console Switch (KVM), 0 x 2 x 16 port	AF617A
PS/2 Interface Adapter, 1 pack	262588-B21
PS/2 Interface Adapter, 8 pack	262587-B21
HP 1x4 Console Switch	AF611A
HP PS2 Server Console Cable, 6 foot, 2-Pack	AF612A
HP USB Server Console Cable, 6 foot, 2-Pack	AF613A

NOTE: required for supporting USB peripherals.

NOTE: Cat5e cables are required to connect Interface Adapters to Console Switches. Cat5e cables can be found at the following URL: http://www.hp.com/go/kvm

HP Serial Console Server Options

Additional Options

	HP 16 Port Serial Console Server (worldwide)	AF101A
	HP 48 Port Serial Console Server (worldwide)	AF102A
	Serial Adapter, RJ45-D89 DCE Female, 1-pack	AF103A
	Serial Adapter, RJ45-D89 DCE Female, 8-pack	AF110A
	NOTE: For additional information regarding KVM switches, Serial Console servers, rack mount monitors, keyboards and all related options please see the following URL: http://www.hp.com/go/kvm	
USB Options	USB 1.44-MB External Diskette Drive	DC141B
	USB Floppy Drive	DC361B
	HP USB-P/S2 Mouse	DC369A
	HP USB 04 Standard Keyboard	DT528A#ABA
Service and Support Offerings (HP Care Pack Services)	Hardware Services 4-Hour On-site Service	
	13-Hour x 5-Day Coverage, 3 Years, Electronic	UM828E
	24-Hour x 7 Day Coverage, 3 Years, Electronic	UM829E
	Hardware Services Next Business Day On-Site Service	
	9-Hour x 5-Day Coverage, 3 Years, Electronic	UM827E
	Hardware Services 6-Hour Call to Repair On-Site Service	
	Hardware Installation, Electronic	UM830E
	HP LO100i Advanced Pack 3 year 24x7 Software Support	UM748E
	NOTE: For more information, customer/resellers can contact: http://www.hp.com/services/carepack	

Memory

HP ProLiant DL170h G6 Server

NOTE: Memory configurations listed do not apply to "Factory Integrated Models".

Standard Memory

6GB (3x2GB)/server node, PC3-10600E Unregistered DIMM memory, with ECC

Maximum Memory

Up to 24 GB, using PC3-10600E DDR3 Unbuffered (UDIMM) memory, operating at 1066MHz when fully populated at 2 DIMMs per Channel in 12 slots

Up to 128 GB, using PC3-10600R-9 DDR3 Registered (RDIMM) memory, operating at 800MHz when fully populated in 16 slots

NOTE: RDIMMs and UDIMMs cannot be in the same system so the maximum RDIMM memory configuration can only be achieved with BTO models by replacing all of the UDIMMs.

NOTE: Chart does not represent all possible memory configurations.

DDR3 memory population guidelines

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator

- Some DIMM installation guidelines are summarized below:
- For servers with sixteen (16) memory slots
- There are three (3) channels per processor; six (6) channels per server
- There are two (3) DIMM slots for two memory channels and one (2) DIMM slots for one memory channel; sixteen (16) total slots
- Memory channel 1 consists of the two (2) DIMM slots that are closest to the processor
- Memory channels 2 and 3 consist of the six (6) DIMM slots that are furthest from the processor
- DIMM slots that are white should be populated first
- Do not mix Unbuffered memory (UDIMMs) with Registered memory (RDIMMs)
- Do not install DIMMs if the corresponding processor is not installed
- If only one processor is installed in a 2CPU system, only half of the DIMM slots are available
- To maximize performance, balance the total memory capacity between all installed processors
- It is not required, but it is recommended to load the channels similarly if possible
- You can only have up to eight (8) ranks installed per channel
- You can only install two quad-rank DIMMs per channel
- You can only install two UDIMMs per channel; if available, the third slot in the channel must remain empty
- Populate DIMMs from heaviest load (quad-rank) to lightest load (single-rank) within a channel
- Heaviest load (DIMM with most ranks) within a channel goes furthest from the chipset
- For memory mirroring mode, channel 3 must be unpopulated. Channels 1 and 2 are populated identically
- For lock-step mode, channel 3 must be unpopulated. DIMMs in channels 1 and 2 will be installed in pairs. The paired slots will be 1,4; 2,5; 3;6 on a 3DPC system or 1,4; 2,5; on a 2DPC system
- No mixing DIMM voltage; all DIMMs must be the same voltage

Memory

DIMM Type ->	Registered DIMMs (RDIMMs)					Unbuffered with ECC DIMMs (UDIMMs)	
DIMM Rank ->	Dual Rank (2R)				Quad Rank (4R)	Single Rank (1R)	Dual Rank (2R)
DIMM Capacity ->	2GB	4GB	8GB	8GB	4GB	1GB	2GB
DIMM Native Speed (MHz) ->	1333	1333	1066	1333	1066	1333	1333
SLOTS THAT CAN BE POPULATED							
16 slot servers	16	16	16	16	12	12	12
MAXIMUM MEMORY CAPACITY (GB)							
16 slot servers	32	64	128	128	48	12	24
POPULATED DIMM SPEED (MHz)							
1 DIMM Per Channel	1333	1333	1066	1333	1066	1333	1333
2 DIMMs Per Channel	1333*	1333*	1066	1333*	800	1066	1066
3 DIMMs Per Channel (on 2 channels)	800	800	800	800	N/A	N/A	N/A

*supported with ROM update via ROM Based Setup Utility (RBSU)

DIMM slot and configuration diagrams

Basic memory slot & population diagram

- Population order; start with "A" first, "B" second, "C" third, etc. Channel 1 is channel furthest away from the CPU and Channel 3 is channel closest to CPU.

16 DIMM SLOTS (8 per CPU node)					
	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A	1	A	Chnl 1
	2	D	2	D	
	3	G	3	G	
Chnl 2	4	B	4	B	Chnl 2
	5	E	5	E	
	6	H	6	H	
Chnl 3	7	C	7	C	Chnl 3
	8	F	8	F	

Standard memory configuration (1 CPU model)

- 6GB, consisting of three (3) 2GB dual-rank PC3-10600E UDIMMs

Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 2GB DIMM	1	A; empty	Chnl 1
	2	D; empty	2	D; empty	
	3	G; empty	3	G; empty	
Chnl 2	4	B; 2GB DIMM	4	B; empty	Chnl 2
	5	E; empty	5	E; empty	
	6	H; empty	6	H; empty	
Chnl 3	7	C; 2GB DIMM	7	C; empty	Chnl 3
	8	F; empty	8	F; empty	

Standard memory plus optional memory (1 CPU model)

- 12GB, consisting of three (3) 2GB UDIMMs plus three (3) 2GB UDIMMs
  - 6x 2GB dual-rank PC3-10600E UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 2GB DIMM	1	A; empty	Chnl 1
	2	D; 2GB DIMM	2	D; empty	
	3	G; empty	3	G; empty	
Chnl 2	4	B; 2GB DIMM	4	B; empty	Chnl 2
	5	E; 2GB DIMM	5	E; empty	
	6	H; empty	6	H; empty	
Chnl 3	7	C; 2GB DIMM	7	C; empty	Chnl 3
	8	F; 2GB DIMM	8	F; empty	

Standard memory replaced with optional memory (1 CPU model)
RDIMM maximum configuration

- 64GB, consisting of eight (8) 8GB dual-rank PC3-10600 RDIMMs

Memory

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 8GB DIMM	1	A; empty	Chnl 1
	2	D; 8GB DIMM	2	D; empty	
	3	G; 8GB DIMM	3	G; empty	
Chnl 2	4	B; 8GB DIMM	4	B; empty	Chnl 2
	5	E; 8GB DIMM	5	E; empty	
	6	H; 8GB DIMM	6	H; empty	
Chnl 3	7	C; 8GB DIMM	7	C; empty	Chnl 3
	8	F; 8GB DIMM	8	F; empty	

Standard memory replaced with optional memory (2 CPU model)
RDIMM maximum configuration

- 128GB, consisting of sixteen (16) 8GB dual rank PC3-10600 RDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 8GB DIMM	1	A; 8GB DIMM	Chnl 1
	2	D; 8GB DIMM	2	D; 8GB DIMM	
	3	G; 8GB DIMM	3	G; 8GB DIMM	
Chnl 2	4	B; 8GB DIMM	4	B; 8GB DIMM	Chnl 2
	5	E; 8GB DIMM	5	E; 8GB DIMM	
	6	H; 8GB DIMM	6	H; 8GB DIMM	
Chnl 3	7	C; 8GB DIMM	7	C; 8GB DIMM	Chnl 3
	8	F; 8GB DIMM	8	F; 8GB DIMM	

UDIMM maximum configuration

- 24GB, consisting of twelve (12) 2GB dual-rank PC3-10600 UDIMMs

	CPU1		CPU2		
	slot #	population order	slot #	population order	
Chnl 1	1	A; 2GB DIMM	1	A; 2GB DIMM	Chnl 1
	2	D; 2GB DIMM	2	D; 2GB DIMM	
	3	G; empty	3	G; empty	
Chnl 2	4	B; 2GB DIMM	4	B; 2GB DIMM	Chnl 2
	5	E; 2GB DIMM	5	E; 2GB DIMM	
	6	H; empty	6	H; empty	
Chnl 3	7	C; 2GB DIMM	7	C; 2GB DIMM	Chnl 3
	8	F; 2GB DIMM	8	F; 2GB DIMM	

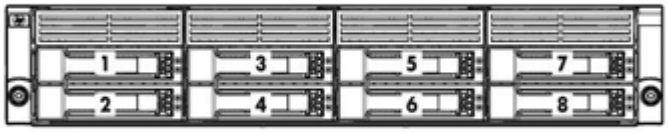
NOTE: Capacity references are rounded to the common Gigabyte values.

- 1GB = 1024MB
- 2GB = 2048MB
- 4GB = 4096MB
- 8GB = 8192MB

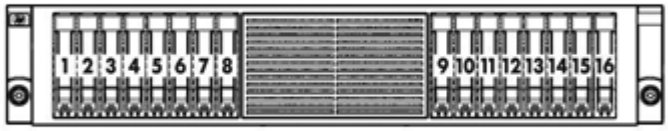
Following are memory options available from HP:

Memory	Registered DIMMs (RDIMMs)	
	HP 2GB 2Rx8 PC3-10600R-9 Kit	500656-B21
	HP 4GB 2Rx4 PC3-10600R-9 Kit	500658-B21
	HP 4GB 4Rx8 PC3-8500R-7 LP Kit	500660-B21
	HP 8GB 2Rx4 PC3-10600R-9 Kit	500662-B21
	HP 8GB 2Rx4 PC3-8500R-7 Kit	516423-B21
	Unbuffered with ECC DIMMs (UDIMMs) NOTE: Maximum 12 DIMMs supported per node.	
	HP 1GB 1Rx8 PC3-10600E-9 Kit	500668-B21
	HP 2GB 2Rx8 PC3-10600E-9 Kit	500670-B21
	NOTE: For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator.	
	NOTE: There is a maximum support limitation of 8 ranks per memory channel (maximum of 2 quad rank DIMMs per channel)	

1-8 Eight 3.5" Hot-plug SAS/SATA hard drive bays



1-16 Sixteen 2.5" Hot-plug SAS/SATA hard drive bays



Drive Support

Removable Media

	Quantity Supported	Position Supported	Controller
DVD-ROM	Up to 2 per node	External	USB
DVD/CD RW	Up to 2 per node	External	USB

Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

SATA Hot Plug 3.5" Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
250GB 3G SATA 7.2K 500GB 3G SATA 7.2K 750GB 3G SATA 7.2K 1TB 3G SATA 7.2K	Up to 8	1-8	Embedded SATA with integrated SATA RAID 0,1 HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SATA Hot Plug 3.5" Entry (ETY) Drives

	Quantity Supported	Position Supported	Controller

Storage

160GB 3G SATA 7.2K	Up to 8	1-8	Embedded SATA with integrated SATA RAID 0,1 HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SATA Hot Plug SFF Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500GB 3G SATA 7.2K 160GB 3G SATA 7.2K	16	1-16	Embedded SATA with integrated SATA RAID 0,1 HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SAS Hot Plug 3.5"Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
1TB 3G 7.2K 750 3G 7.2K	Up to 8	1-8	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SAS Hot Plug 3.5" Enterprise (ENT) Drives

	Quantity Supported	Position Supported	Controller
72GB 3G 15K 146GB 3G 15K 300GB 3G 15K 300GB 6G 15K 450GB 3G 15K 450GB 6G 15K 400GB 3G 10K 600GB 6G 15K	Up to 8	1-8	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SAS Hot Plug 2.5" Midline (MDL) Drives

	Quantity Supported	Position Supported	Controller
500GB 6G SAS 7.2K	Up to 16	1-16	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

SAS Hot Plug SFF Enterprise (ENT) Drives

Storage

	Quantity Supported	Position Supported	Controller
300GB 3G SAS 10K DP 300GB 6G SAS 10K DP 146GB 6G SAS 15K DP 146GB 3G SAS 15K DP 146GB 6G SAS 10K DP 146GB 3G SAS 10K DP 72GB 6G SAS 15K DP 72GB 3G SAS 15K DP 72GB 3G SAS 10K DP	16	1-16	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/256 MB Controller HP Smart Array P410/256 MB Controller HP Smart Array P410/512 MB BBWC Controller

External Storage

	Quantity Supported	Position Supported	Controller
50 Modular Smart Array	Up to 4	External	HP Smart Array P800/512 BBWC Controller
60 HP StorageWorks Modular Smart Array	Up to 8	External	HP Smart Array P800/512 BBWC Controller HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller
	Up to 4	External	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/ 256 MB Controller
70 HP StorageWorks Modular Smart Array	Up to 4	External	HP Smart Array P800/512 BBWC Controller HP Smart Array P411/256 MB Controller HP Smart Array P411/512 MB BBWC Controller
	Up to 2	External	HP Smart Array P212/Zero Memory Controller HP Smart Array P212/ 256 MB Controller

Power Specifications

Operational Input Voltage Range (Vrms)	90Vac to 264Vac full range					
Frequency Range (Nominal) (Hz)	47 Hz to 63 Hz					
Nominal Input Voltage (Vrms)	100	115	200	220	230	240
Max Rated Output Wattage Rating	653.10	653.19	653.08	652.96	653.08	652.96
Nominal Input Current (A rms)	8.55	7.31	4.12	3.77	3.6	3.46
Max Rated Input Wattage Rating (Watts)	855	840.72	824.12	827.5	806.3	805.71
Max. Rated VA (Volt-Amp)	990	990	990	990	990	990
Efficiency (%)	76.39	77.69	79.25	78.91	81	81.04
Power Factor	0.998	0.997	0.983	0.976	0.973	0.969
Leakage Current (mA)	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA
Maximum Inrush Current (A peak)	60A	60A	60A	60A	60A	60A
Maximum Inrush Current Duration (mS)	1mS	1mS	1mS	1mS	1mS	1mS

To review typical system power ratings use the Active Answers HP Power Advisor which is available via the online tool located at URL: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor

To drill down to calculators:
- Click on: "ProLiant Servers"
- Click on the Server of interest. Example: HP ProLiant DL1000 G6
- Click on: "Power Calculator" link. (You may need to scroll down to see it)

System Specifications

Power		
ProLiant DL170h G6 Fully Configured	115V/60Hz	220V/50Hz
Fully Loaded System Input Wattage (W)	651	638
Fully Loaded System Input Current (A rms)	5.7	3.0
Fully Loaded System Thermal (BTU- Hr)	2218	2174
Fully Loaded System VA (Volt-Amp)	657	657
System Leakage with all power supplies loaded (mA)	1.58	3.03
System Inrush Current with all power supplies loaded (A)	19	37
Power cord requirements	Nema 5-15P to IEC320-C13	IEC320-C13 to IEC320-C14
NOTE: Power shown is for a fully configured system consisting of (2) CPUs, (16) DIMMs, (2) HDDs, and (1) PCI card per node.		
Power Cord		AF556A

Server Power Cords

One 6' Highline (IEC-IEC) power cord ships standard

NOTE: ProLiant DL servers are primarily connected to PDU's in data center racks so they ship standard with only a PDU power cord (416151-B21). If a user wishes to power a ProLiant DL server using a 110V receptacle (NEMA-15), the NEMA power cord (227099-001) must be ordered separately.

NOTE: If customers require a local power cord, they can check the power cord matrix for the appropriate cord. Please see the following power cord matrix: http://www.hp.com/go/powercordmatrix.

System Unit	**Dimensions** (H x W x D) (with bezel)	3.44 x 17.64 x 28.91 in (8.74 x 44.81 x 73.43 cm)	
	Weight (approximate)	Maximum (all hard drives, power supplies, and processors installed)	72.00 lb (32.7 kg)
		Minimum (one hard drive, power supply, and processor installed)	40.00 lb (18.2 kg)
	Input Requirements (per power supply)	Rated Line Voltage	90 to 140 VAC 180 to 264 VAC
		Rated Input Current	7.31A at 115VAC 3.6A at 230VAC
		Rated Input Frequency	47 to 63 Hz
		Rated Input Power	855W (at 100 VAC), 840.72W (at 200 VAC)
	Power Specifications	NOTE: To review typical system power ratings use the HP Power Advisor which is available online located at url: www.hp.com/go/proliant-energy-efficient or www.hp.com/go/hppoweradvisor	
	Power Supply Output (per power supply)	Rated Steady-State Power	653.10W (at 100 VAC), 653.08W (at 200 VAC)
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 305 m) above sea level to a maximum of 10,000 ft (3050 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).
		Non-operating	40° to 140° F (-40° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr).
	Relative Humidity (non-condensing)	Operating	10% to 85% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
		Non-operating	10% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	10,000 ft (3050 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
		Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
	Acoustic Noise	Listed are the declared A-Weighted sound power levels (L_{WAd}) and declared	

		average bystander position A-Weighted sound pressure levels (L_{pAm}) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).
		Idle
		L_{WAd} 7.3
		L_{pAm} 55dBA
		Operating
		L_{WAd} 7.3
		L_{pAm} 55dBA
Emissions Classification (EMC)	FCC Rating	Class A
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1
		NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

HP Smart Array B110i SATA RAID Controller	Simultaneous drive transfer channels	4 channels
	Transfer rate synchronous (maximum theoretical)	1.5 Gb/s
	Data transfer method	Intel® ICH10R
	Drive support	Serial ATA
	Data transfer modes	Legacy Mode Combined Mode
	Protocol	Serial ATA
	Feature	NCQ (Native Command Queuing); AHCI (Advanced Host Controller Interface)
	RAID levels supported	0, 1, 10
	RAID Features	Supports multiple logical volumes Setup through ROM based Array Configuration Utility Installation scripting support NOTE: This controller does not support Hot Plug functions
	RAID OS Support	Microsoft Windows Server 2003 x32 and x64 Editions Microsoft Windows Server 2008 x32 and x64 Editions. Red Hat Enterprise Linux 4 (x86) Red Hat Enterprise Linux 5 (x86) Red Hat Enterprise Linux 5 (AMD64/EM64T) SUSE Linux Enterprise Server 10 (x86) SUSE Linux Enterprise Server 10 (AMD64/EM64T) SUSE Linux Enterprise Server 11 (x86) SUSE Linux Enterprise Server 11 (AMD64/EM64T)

Embedded NC362i PCIe Gigabit Server Adapter	Network Interface	Integrated 10/100/1000BASE-T Transceiver Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.
	Data Transfer Method	Compliant to x4 PCIe Specification
	Network Transfer Rate	10Base-T (Half-Duplex) 10 Mb/s 10Base-T (Full-Duplex) 20 Mb/s 100Base-TX (Half-Duplex) 100 Mb/s 100Base-TX (Full-Duplex) 200 Mb/s 1000Base-TX (Half and Full-Duplex) 2000Mb/s
	Connector	RJ-45 connector
	Cable Support	Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethemet on standard Category 5 UTP

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.